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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,007	03/29/2006	Katsutoshi Nishizaki	4731-0131PUS1	4338

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BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

MUSTAFA, IMRAN K

ART UNIT	PAPER NUMBER
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3663

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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No. 10/574,007	Applicant(s) NISHIZAKI ET AL.	
	Examiner IMRAN MUSTAFA	Art Unit 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/30/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1 rejected under 35 U.S.C. 102(b) as being anticipated by Shunichi (JP 2002-029433).

As to claim 1 Shunichi discloses an electric power steering system causing an electric motor to generate a steering assist force according to a steering torque(Abstract), comprising:

a torque sensor for detecting the steering torque (Abstract);

phase compensation means acting when a target control value of the electric motor is generated based on an output from the torque sensor(Abstract); and

means for varying the characteristics of the phase compensation means depending upon whether a steering mode is steer with driving or steer without driving (Abstract).

As to claim 2 Shunichi discloses an electric power steering system, wherein the phase compensation means includes a first phase compensator for steer with driving and a second phase compensator for steer without driving(Abstract), and

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wherein the means for varying the characteristics of the phase compensation means comprises means for making changeover of the phase compensators in order that the target control value is generated by means of the first phase compensator in the case of steer with driving and that the target control value is generated by means of the second phase compensator in the case of steer without driving (Abstract).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shunichi (JP-2002-029433) in view of Kawada(US 6,381,528)

As to claim 3 Shunichi discloses an electric power steering system wherein the phase compensation means includes a first phase compensator dedicated to steer with driving(Abstract), and a second phase compensator dedicated to steer without driving(Abstract)

Shunichi does not explicitly disclose of the phase compensator having a damping peak at a predetermined frequency. Kawada however teaches of a power steering system with a phase compensator having a damping peak at a predetermined frequency(Column 6 lines 7-35) wherein the damping peak of the second phase

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compensator is on a lower frequency side than the damping peak of the first phase compensator(Column 6 lines 7-35).

. According to KSR (G) some teaching, suggestion, or motivation in the prior art (improving the steering feel for a driver) that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

As to claim 4 Shunichi discloses of a power steering system with a correcting means for making a phase delay correction (Abstract). Shunichi however does not explicitly disclose of a transfer function used for phase compensation. Kawada discloses an electric power steering system wherein the phase compensation means is represented by a transfer function $G_{sub.c}(s)$ of the following formula, and parameters $\zeta_{sub.2}$ and $\omega_{sub.2}$ of the transfer function $G_{sub.c}(s)$ are set to values to reduce or cancel a peak of a gain characteristic of an open-loop transfer function for torque of the electric power steering system, the peak appearing based on natural vibrations of a mechanical system and a counter-electromotive force of the motor:

$$G_{sub.c}(s) = \frac{(s^2 + 2\zeta_{sub.2}\omega_{sub.2}s + \omega_{sub.2}^2)}{(s^2 + 2\zeta_{sub.1}\omega_{sub.1}s + \omega_{sub.1}^2)},$$

where $\zeta_{sub.1}$ denotes a compensated damping coefficient; $\zeta_{sub.2}$ denotes a damping coefficient of a compensated system; $\omega_{sub.1}$ denotes a compensated natural angular frequency; and $\omega_{sub.2}$ denotes a natural angular frequency of the compensated system, all these symbols representing the parameters of the function $G_{sub.c}(s)$ (Column 6 lines 7-35). According to KSR (G) some teaching, suggestion, or motivation in the prior art

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(improving the steering feel for a driver) that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shunichi (JP-2002-029433) in view of Kawada(US 6,381,528) in view of Endo(US 5,732,373)

As to claim 5 Shunichi discloses an electric power steering system wherein the phase compensation means includes a first phase compensator dedicated to steer with driving(Abstract), and a second phase compensator dedicated to steer without driving(Abstract)

Shuincihi does not explicitly disclose of a system wherein the damping peak of the at least one of the first compensator and the second compensator has a frequency lower than a peak frequency of the natural mechanical vibrations of the steering system. Endo however teaches of having a frequency lower than a peak frequency (See Column 1 lines 52-Column 2 lines 1-2). According to KSR (G) some teaching, suggestion, or motivation in the prior art (improving the steering feel for a driver) that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. In this case it would have been obvious to have phase compensator with the motivation of improving the stability of the power steering system.

Response to Arguments

6. Applicant's arguments filed 10/30/2009 have been fully considered but they are not persuasive.

7. On page .6 of the applicant's arguments applicant's argue that Shunichi does not disclose a means for varying the characteristics of the phase compensation means depending upon whether the vehicle is being driven or is not being driven.

The examiner respectfully disagrees with the applicant's arguments. The applicant is reminded that the examiner interprets the claim with the broadest reasonable interpretation. Shunichi clearly discloses a means for varying the characteristics of the phase compensation means depending upon whether the vehicle is being driven or is not being driven (Abstract "improve the quick responsiveness of torque control in the case for expediting steering operation and in the case of repeating periodical steering of small amplitude around a neutral point when **steering without driving or during low speed** [emphasis added] by **adjusting the acting degree of phase delay compensation of torque sensor input** [emphasis added] in a motor-driven power steering"). Thus it is clear that Shunichi discloses this limitation.

On page 7 of the applicant's arguments applicant's argue that Shunichi has **no concept of phase compensation** means that includes a **first phase compensator for steer with driving and a second phase compensator for steer without driving**, or of the claimed different target control values generation for when the vehicle is being driven.

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The examiner respectfully disagrees with the applicant's arguments. Shunichi clearly discloses of first phase compensator for steer with driving and a second phase compensator for steer without driving (Abstract "improve the quick responsiveness of torque control in the case of expediting steering operation and in the case of repeating periodical steering of small amplitude around a neutral point when steering without driving or during low speed by **adjusting the acting degree of phase delay compensation of torque sensor input**[emphasis added] in a motor-driven power steering"). Shunichi also clearly discloses of the claimed different target control values (control unit is provided with a correcting means for making a phase delay correction and advance correction on the basis of the output of the torque sensor. When the **steering torque is a specified value or less, the acting degree of the phase delay correction of the correcting means is lowered** [emphasis added] to improve the quick responsiveness of steering torque control."). Thus it is clear that Shunichi discloses the claimed invention.

On page 11 of the applicant's arguments applicants argue that Kuwada does not disclose of the phase compensator itself has any specific damping peak at a predetermined frequency.

The examiner respectfully disagrees with the applicant's arguments. Kuwada discloses of a phase compensator has a specific damping frequency(Column 6 lines 7-35 The robust stabilization compensation section 125 is a compensating section disclosed in Japanese Patent Application Laid-Open No. 8-290778 A. This compensation section has a characteristic expression $G(s) = (s + \omega_n)^{-2}$

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$+a_1 \cdot s + a_2 / (s^2 + b_1 \cdot s + b_2)$, where "s" represents a Laplace operator. The **compensation section removes a peak value of a resonance frequency** of a resonance system that comprises an inertia element and a spring element included in a detection torque. Based on this, the compensating section **compensates for a deviation in the phase of the resonance frequency that hinders the stability and the responsiveness of the control system**. In the characteristic expression $G(s)$, a_1 , a_2 , b_1 and b_2 represent parameters that are determined based on the resonance frequency of the resonance system").

On page 11 of the applicant's arguments applicants argue that Kawada does not disclose of the characteristic expression in claim 4.

The examiner respectfully disagrees with the applicant's arguments. Kawada clearly teaches of the characteristic equation as described in claim 4 (Column 7 lines 7-35). Kawada teaches that these coefficients in this equation are determined based on the resonance frequency of the resonance system.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IMRAN MUSTAFA whose telephone number is (571)270-1471. The examiner can normally be reached on Mon-Fri 7:30AM-5:00PM, Alt Fri, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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12/23/2009

/Jack W. Keith/

Supervisory Patent Examiner, Art Unit 3663